Claims

1 (original): A purified p28ING5 tumor suppressor protein having a sequence comprising amino acid residues 1-13 and 241-356 of SEQ ID NO: 2, or a sequence having one or more conservative substitutions thereof.

2 (original): The tumor suppressor protein of claim 1, wherein the tumor suppressor protein comprises the sequence of SEQ ID NO: 2.

3 (original): A recombinant polynucleotide encoding the protein of claim 1.

4 (original): The recombinant polynucleotide of claim 3, wherein the recombinant polynucleotide has a sequence comprising of SEQ ID NO: 1.

5 (original): A recombinant nucleic acid molecule comprising a promoter sequence operably linked to the recombinant polynucleotide of claim 3.

6 (original): The recombinant nucleic acid molecule of claim 5, wherein the recombinant polynucleotide is in antisense orientation relative to the promoter sequence.

7 (currently amended): A recombinant vector comprising the recombinant nucleic acid molecule of claim 5 ~~or 6~~.

8 (currently amended): A cell transfected with the recombinant nucleic acid molecule of claim 5 ~~or 6~~.

9 (original): A cell transfected with the recombinant vector of claim 7.

10 (currently amended): A transgenic non-human animal, comprising the cell of claim 8 ~~or 9~~.

11 (currently amended): ~~An isolated oligonucleotide of~~The recombinant polynucleotide of claim 3, wherein the recombinant polynucleotide is at least 10 nucleotides in length ~~that~~ and specifically hybridizes under low stringency conditions to nucleotide residues 1-39 or 723-1068 of SEQ ID NO: 1.

12 (original): The oligonucleotide according to claim 11, wherein the oligonucleotide comprises at least 10 contiguous nucleotides of the nucleotides 1-39 of the sequence set forth as SEQ ID NO: 1, or a variant thereof, that hybridizes to SEQ ID NO: 1 under high stringency conditions.

13 (original): The oligonucleotide according to claim 11, wherein the oligonucleotide comprises at least 10 contiguous nucleotides of the nucleotides 723-1068 of the sequence set forth as SEQ ID NO: 1, or a variant thereof, that hybridizes to SEQ ID NO: 1 under high stringency conditions.

14 (original): The isolated oligonucleotide according to claim 11, wherein the oligonucleotide comprises at least 20 contiguous nucleotides of the nucleotides 1-39 of the sequence set forth as SEQ ID NO: 1, or a variant thereof, that hybridizes to SEQ ID NO: 1 under high stringency conditions.

15 (original): The isolated oligonucleotide according to claim 11, wherein the oligonucleotide comprises at least 20 contiguous nucleotides of the nucleotides 723-1068 of the sequence set forth as SEQ ID NO: 1, or a variant thereof, that hybridizes to SEQ ID NO: 1 under high stringency conditions.

16 (original): The oligonucleotide according to claim 11, wherein the oligonucleotide hybridizes with a nucleic acid sequence comprising nucleotides 1-39 of the sequence as set forth in SEQ ID NO: 1 under wash conditions of 65° C, 0.5X SSC and 0.1% SDS.

17 (original): The oligonucleotide according to claim 11, wherein the oligonucleotide hybridizes with a nucleic acid sequence comprising nucleotides 1-39 of the sequence as set forth in SEQ ID NO: 1 under wash conditions of 55° C, 2.0X SSC and 0.1% SDS.

18 (original): The oligonucleotide according to claim 11, wherein the oligonucleotide hybridizes with a nucleic acid sequence comprising nucleotides 723-1068 of the sequence as set forth in SEQ ID NO: 1 under wash conditions of 65° C, 0.5X SSC and 0.1% SDS.

19 (original): The oligonucleotide according to claim 11, wherein the oligonucleotide hybridizes with a nucleic acid sequence comprising nucleotides 723-1068 of the sequence as set forth in SEQ ID NO: 1 under wash conditions of 55° C, 2.0X SSC and 0.1% SDS.

20 (currently amended): A method of inhibiting cellular proliferation, comprising: transfecting a cell with an expression vector comprising a promoter operably linked to nucleotides 1-39 and 723-1068 of the ~~sequence set forth in SEQ ID NO: 1~~recombinant polynucleotide of claim 4, thereby inhibiting cellular proliferation.

21 (original): The method of claim 20, wherein the expression vector comprises a promoter operably linked to a nucleic acid sequence as set forth in SEQ ID NO: 1, or a conservative substitution thereof.

22 (currently amended): A method of inhibiting cellular proliferation, comprising: contacting a cell with ~~a protein comprising amino acid residues 1-13 and 241-356 of the sequence as set forth in SEQ ID NO: 2~~the protein of claim 1, thereby inhibiting cellular proliferation.

23 (original): The method of claim 22, wherein the protein has an amino acid sequence comprising the sequence set forth in SEQ ID NO: 2, or a conservative substitution thereof.

24 (original): A method for enhancing cellular proliferation, comprising transfecting a cell with an expression vector comprising the recombinant nucleic acid molecule of claim 6.

25 (original): The method of claim 24, wherein the expression vector comprises a nucleotide sequence as set forth in SEQ ID NO: 1, or a conservative substitution thereof, operably linked to a promoter sequence.

26 (currently amended): A specific binding agent that specifically binds an epitope of the protein encoded by the ~~amino acid sequence as set forth in SEQ ID NO: 2~~protein of claim 2.

28 (currently amended): A method of screening for an agent that modulates p28ING5 tumor suppressor activity, the method comprising:

transfecting a cell with an expression vector, wherein the expression vector comprises ~~a nucleic acid molecule having a sequence as set forth in SEQ ID NO: 1~~the recombinant polynucleotide of claim 4, or a conservative substitution thereof, operably linked to a promoter sequence;

contacting the cell with a test agent; and

detecting a change in the level of expression of the p28ING5 protein, wherein a change in the level is indicative that the test agent is an agent that modulates the expression of the p28ING5 tumor suppressor protein.

29 (currently amended): A method of detecting a p28ING5 tumor suppressor protein in a biological sample, comprising:

amplifying ~~nucleotide residues as set forth in SEQ ID NO: 1~~the recombinant polynucleotide of claim 4, or a conservative substitution thereof, with two or more oligonucleotide primers that specifically bind the ~~nucleotide residues as set forth in SEQ ID NO: 1~~recombinant polynucleotide;

detecting a level of an amplified product, thereby detecting the p28ING5 tumor suppressor protein.

30 (currently amended): A method of diagnosing the presence of a tumor in a subject, comprising:

amplifying ~~a nucleic acid molecule having a sequence as set forth in SEQ ID NO: 1~~the recombinant polynucleotide of claim 4, or a conservative substitution thereof, in a sample using two or more oligonucleotide primers that specifically bind the ~~nucleotide residues as set forth in SEQ ID NO: 1~~recombinant polynucleotide;

detecting an amplified product if one is produced, wherein absence of the amplified product is indicative of the presence of a tumor in a subject.

31 (original): The method of claim 30, wherein the tumor comprises a breast tumor, a lung tumor, a colon tumor, a pancreatic tumor, a liver tumor, a brain tumor, a skin tumor, a prostate tumor, a testicular tumor, an ovarian tumor, a stomach tumor, or a tumor of the blood.

32 (original): The method of claim 30, wherein the subject is a human.

33 (original): The method of claim 30, wherein the sample comprises blood, a blood product, urine, saliva, a tissue biopsy, a surgical specimen, an amniocentesis sample, or autopsy material.

34 (original): The method of claim 30, further comprising reverse transcribing a mRNA having a sequence as shown in SEQ ID NO: 1, or a conservative substitution thereof, in the sample.

35 (original): The method of claim 30, further comprising identifying a change in the level of the amplified product compared to a second sample, or identifying a mutation in the amplified product.

36 (original): The method of claim 35, wherein identifying a change in the level of amplified product comprises Southern blot analysis, quantitative polymerase chain reaction or semi-quantitative polymerase chain reaction.

37 (original): The method of claim 35, wherein identifying a mutation in the amplified product comprises sequencing, chemical cleavage, denaturing gradient gel electrophoresis, or hybridization with allele specific oligonucleotides.

38 (currently amended): A method of treating a neoplasm, comprising contacting a neoplastic cell with ~~a protein having an amino acid sequence as set forth in SEQ ID NO: 2~~the protein of claim 2, or a conservative substitution thereof.

39 (original): An *in vitro* assay kit for determining whether or not a subject has a biological condition associated with p28ING5 expression by detecting an underabundance of p28ING5 protein in a sample of tissue and/or body fluids from the subject, comprising:

a container comprising an antibody specific for p28ING5 protein; and

instructions for using the kit, the instructions indicating steps for performing a method to detect the presence of p28ING5 protein in the sample; and analyzing data generated by the method, wherein the instructions indicate that underabundance of p28ING5 protein in the sample indicates that the individual has the biological condition.

40 (original): An *in vitro* amplification assay kit for determining whether or not a subject has a biological condition associated with a p28ING5 nucleic acid by detecting presence and/or quantity of a nucleic acid that encodes p28ING5 protein in a sample of tissue and/or body fluids from the subject, the kit comprising:

a first container comprising an *in vitro* amplification primer that specifically amplifies the nucleic acid that encodes p28ING5 protein;

a second container comprising a size marker, the size marker being the expected size of amplified DNA if the nucleic acid that encodes p28ING5 protein is present in the sample; and

instructions for using the kit, wherein the instructions indicate steps for performing a method to detect and/or quantify the nucleic acid that encodes p28ING5 protein in the sample; and analyzing data generated by the method,

wherein the instructions indicate that the presence of increased nucleic acid that encodes p28ING5 protein in the sample indicates that the subject has the biological condition.

41 (original): The recombinant polynucleotide of claim 3, wherein the recombinant polynucleotide has a sequence comprising nucleotide residues 1-39 of SEQ ID NO: 1.

42 (original): The recombinant polynucleotide of claim 3, wherein the recombinant polynucleotide has a sequence comprising nucleotide residues 723-1068 of SEQ ID NO: 1.

43 (original): The recombinant polynucleotide of claim 3, wherein the recombinant polynucleotide has a sequence comprising nucleotide residues 1-39 and 723-1068 of SEQ ID NO: 1.